

REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

Disposition of Claims

Claims 1-43 were pending in this application. By way of this reply, claims 1-39 and 42 are cancelled without prejudice or disclaimer. Further, claims 44-56 are added. Claims 40, 43, 47, and 52 are independent. The remaining claims depend, either directly or indirectly, from claims 40, 43, 47, and 52.

Claim Amendments

Claims 40, 41, and 43 are amended to clarify the invention. No new matter has been added by way of the amendments. Support for these amendments may be found, for example, in paragraphs [1026]-[1048] of the Specification.

Drawings

Applicant respectfully requests that the Examiner indicate that the drawings filed April 11, 2000 are accepted.

Information Disclosure Statement (IDS)

An IDS filed on April 13, 2004 has not been considered by the Examiner. A copy of form PTO-1449 filed in April 13, 2004 is included with this response. Applicant respectfully requests that the Examiner initial each reference listed on form PTO-1449.

Rejections under 35 U.S.C. § 101

Claims 40-42 are rejected under 35 U.S.C. § 101 as being directed towards non-statutory subject matter. Claim 42 is cancelled by way of this reply. Thus, the rejection is now moot with respect to claim 42. To the extent that the rejection may apply to amended claims 40 and 41, the rejection is respectfully traversed.

Under 35 U.S.C. § 101, “[w]hen functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized.” MPEP § 2106. Independent claim 40 clearly recites that the computer program product is “stored on a computer readable medium.” Thus, independent claim 40 is clearly directed to statutory subject matter. Claim 41 depends from independent claim 40 and is therefore directed to at least the same statutory subject matter. Accordingly, withdrawal of this rejection is respectfully requested.

Rejections under 35 U.S.C. § 102

Claims 1, 2, 4, 5, 15-19, 25-28, 30, and 31 are rejected under 35 U.S.C. § 102(b) as being anticipated by Janice M. Stone’s “A Simple and Correct Shared-Queue Algorithm Using Compare-and-Swap,” © 1990 (hereinafter “Stone”). Claims 1, 2, 4, 5, 15-19, 25-28, 30 and 31 have been cancelled. Thus the rejection is now moot with respect to the cancelled claims. Accordingly, withdrawal of this rejection is respectfully requested.

Rejections under 35 U.S.C. § 103

Claims 3, 6-14, 23-24, and 32-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone in view of Mark Allen Weiss's Data Structures and Algorithm Analysis in C++ Second Edition, © 1999 (hereinafter "Weiss"). Claims 1-39 and 42 have been canceled by this reply. Thus, this rejection is now moot with respect to the canceled claims. Claims 40, 41, and 43 have been amended in this reply. To the extent that this rejection may still apply to amended claims 40, 41, and 43, this rejection is respectfully traversed.

Independent claims 40 and 43 recite a concurrent shared array-based double-ended queue (deque) with end-identifying indices identifying elements adjacent to end elements of the deque. In other words, claims 40 and 43 recite a queue that allows for concurrent access to both ends of the queue, as well as both insertion and removal operations on each end of the queue.

On the other hand, Stone describes a *single-ended* queue with a head and a tail (See Stone, page 497). Further, as described in pages 498-500 of Stone, enqueue operations occur *only* at the tail, and dequeue operations occur *only* at the head. Enqueue operations may not occur at the head, nor may dequeue operations occur at the tail. Thus, Stone discloses a concurrent first-in-first-out (FIFO) queue rather than a concurrent *double-ended* queue. In addition, Stone is completely silent with regard to end identifying indices that identify elements *adjacent* to the end elements. Instead, the head and tail point *directly* to end elements in the queue. See Stone, pp. 502-503. Moreover, the queue of Stone is implemented as a linked list, not an array.

The following is one basis for Applicant's response to the rejections under 35 U.S.C. § 103(a). To establish a *prima facie* case of obviousness, "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." In addition, "there must be a *reasonable expectation of success*." Finally, "the prior art reference (or references when combined) must teach or suggest *all the claim limitations*." MPEP § 2143 (emphasis added). Further, "[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art." MPEP § 2143.03. Applicant asserts that the references, when combined, fail to teach or suggest all the limitations of claims.

Applicant asserts that a FIFO queue with head and tail pointers that point directly to end elements that is implemented as a linked list is not at all the same as the claimed array-based *deque* with end-identifying indices that point to elements *adjacent* to the end elements of the deque. As a result, Stone fails to disclose both the functionality of the deque and the adjacency of the end identifying indexes to the end elements. Further, Applicant asserts that Weiss fails to disclose what Stone lacks.

Specifically, Weiss is also limited to a FIFO queue with pointers that correspond directly to ends of the queue. Like Stone, Weiss states that "enqueue ... inserts an element at the end of the list ... and dequeue ... deletes the element at the start of the list" (*See Weiss*, pg. 111). Once again, insertion *only* occurs at one end of the queue, and deletion *only* occurs at the *other* end of the queue. Further, positions "front" and "back" correspond directly to the ends of the queue, instead of elements *adjacent* to the ends. As a result, neither Stone nor Weiss disclose the limitations of amended independent claims 40 and 43.

In view of the above, it is clear that Stone and Weiss, whether considered separately or in combination, fail to render amended independent claims 40 and 43 as obvious. Dependent claim 42 is allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

New Claims

Claims 44-56 are new. No new matter has been added in the new claims. Support for the new claims may be found, for example, in paragraphs [1026]-[1048] of the Specification. Applicant respectfully asserts that claims 44-56 are allowable for the reasons set forth below.

As established above, independent claims 40 and 43 are patentable over Stone and Weiss, whether considered separately or in combination. Claims 44-46 depend from claims 40 and 43 and are allowable for at least the same reasons.

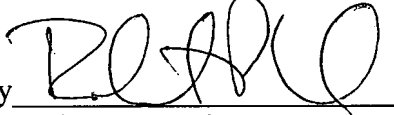
New independent claims 47 and 52 recite limitations similar to those of independent claims 40 and 43, *i.e.*, an array-based double-ended queue (deque) with two identifying indices. Thus, these claims are allowable over the cited prior art for at least the same reasons as given above for claims 40 and 43. Claims 48-51 and 53-56 depend, either directly or indirectly, from claims 47 and 52 and are allowable for at least the same reasons.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 03226/959002).

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Respectfully submitted,

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Attachment: PTO Form 1449 filed April 13, 2004 (2 pages)

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